

CLAIMS

What is claimed is:

- 5 1. A servovalve assembly comprising:
 a housing defining a port;
 a sleeve assembly having:
 a sleeve coupled to the housing, the sleeve defining a bore, a first metering
 aperture, and a second metering aperture, the sleeve having a blocking element
10 oriented between the first metering aperture and the second metering aperture,
 both the first metering aperture and the second metering aperture leading to the
 port defined by the housing, and
 a spool disposed within the bore defined by the sleeve, the spool having a
 first land and a second land, the first land and the second land defining a channel
15 oriented between the first land and the second land; and
 a motor coupled to the housing and coupled to the spool, the motor configured to
 position the spool within the bore (i) in a substantially null position where the first land
 substantially covers the first metering aperture, the second land substantially covers the
 second metering aperture, and the blocking element substantially covers the channel to
20 minimize flow of a fluid from the channel to the port and (ii) in a substantially open
 position where the first land and the second land allow flow of the fluid through the port.
- 25 2. The servovalve assembly of claim 1 wherein the first land defines a first land width
 and the channel oriented between the first land and the second land defines a channel
 width, the first land width being greater than the channel width and the first land width
 configured to overlap at least a portion of the blocking element when the motor orients
 the spool in a substantially null position.
- 30 3. The servovalve assembly of claim 1 wherein the second land defines a second land
 width and the channel oriented between the first land and the second land defines a

channel width, the second land width being greater than the channel width and the second land width configured to overlap at least a portion of the blocking element when the motor orients the spool in a substantially null position.

5 4. The servovalve assembly of claim 1 wherein the sleeve assembly is configured to provide a pressure gain within the servovalve assembly of approximately 30% for each approximately 1% increase in a current of a control signal input to the motor.

10 5. The servovalve assembly of claim 1 wherein the sleeve assembly is configured to provide a pressure gain within the servovalve assembly of approximately 30% for each approximately 1% increase in a current of a control signal input to the motor for a fluid flowing from a fluid source at a flow rate of less than approximately 0.8 gallons per minute and at a pressure differential of less than approximately 300 pounds per square inch.

15 6. The servovalve assembly of claim 1 wherein the fluid comprises aircraft fuel.

7. The servovalve assembly of claim 1 wherein the dynamic viscosity of the fluid is less than approximately 2.0 centistokes.

20 8. A sleeve assembly comprising:

 a sleeve defining a bore, a first metering aperture, and a second metering aperture, the sleeve having a blocking element oriented between the first metering aperture and the second metering aperture, both the first metering aperture and the second metering
25 aperture configured to lead to a port defined by a servovalve assembly; and

 a spool disposed within the bore defined by the sleeve, the spool having a first land and a second land, the first land and the second land defining a channel oriented between the first land and the second land, the spool configured to position within the bore (i) in a substantially null position where the first land substantially covers the first
30 metering aperture, the second land substantially covers the second metering aperture, and

the blocking element substantially covers the channel to minimize flow of a fluid from the channel to the port and (ii) in a substantially open position where the first land and the second land allow flow of the fluid through the port.

- 5 9. The sleeve assembly of claim 8 wherein the first land defines a first land width and the channel oriented between the first land and the second land defines a channel width, the first land width being greater than the channel width and the first land width configured to overlap at least a portion of the blocking element when the spool orients in a substantially null position.

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10. The sleeve assembly of claim 8 wherein the second land defines a second land width and the channel oriented between the first land and the second land defines a channel width, the second land width being greater than the channel width and the second land width configured to overlap at least a portion of the blocking element when the spool
15 orients in a substantially null position.

11. The sleeve assembly of claim 8 wherein the sleeve assembly is configured to provide a pressure gain within a servovalve assembly of approximately 30% for each approximate 1% increase in a current of a control signal input to a motor of the servovalve assembly.

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12. The sleeve assembly of claim 8 wherein the sleeve assembly is configured to provide a pressure gain within the servovalve of approximately 30% for each approximately 1% increase in a current of a control signal input to the servovalve for a fluid flowing from a fluid source at a flow rate of less than approximately 0.8 gallons per minute and at a
25 pressure differential of less than approximately 300 pounds per square inch.

13. The sleeve assembly of claim 8 wherein the fluid comprises aircraft fuel.

14. The sleeve assembly of claim 8 wherein the dynamic viscosity of the fluid is less than
30 approximately 2.0 centistokes.

15. A method for manufacturing a servovalve assembly comprising:

forming a first metering aperture and a second metering aperture within a sleeve defining a bore, the sleeve having a blocking element oriented between the first metering aperture and the second metering aperture;

coupling the sleeve with a servovalve housing, the first metering aperture and the second metering aperture leading to a port defined by the housing;

disposing a spool within the bore defined by the sleeve, the spool having a first land and a second land, the first land and the second land defining a channel oriented between the first land and the second land; and

attaching the spool with a motor coupled to the housing, the motor configured to position the spool, within the bore, (i) in a substantially null position where the first land substantially covers the first metering aperture, the second land substantially covers the second metering aperture, and the blocking element substantially covers the channel to minimize flow of a fluid from the channel to the port and (ii) in a substantially open position where the first land and the second land allow flow of a fluid through the port.

16. The method of claim 11 further comprises forming the first land to define a first land width and forming the channel oriented between the first land and the second land to define a channel width, the first land width being greater than the channel width and the first land width configured to overlap at least a portion of the blocking element when the motor orients the spool in a substantially null position.

17. The method of claim 11 further comprises forming the second land to define a second land width and forming the channel oriented between the first land and the second land to define a channel width, the second land width being greater than the channel width and the second land width configured to overlap at least a portion of the blocking element when the motor orients the spool in a substantially null position.

18. A critical center servovalve assembly, comprising:

a sleeve defining an elongated bore, a first aperture leading between the elongated bore and an external location, and a second aperture leading between the elongated bore and the external location;

5 a spool disposed within the elongated bore, the spool defining a land; and

a motor configured to move the spool between (i) a null position in which the land defined by the spool completely covers the first aperture and overlaps a portion of the sleeve disposed between the first and second apertures to inhibit fluid from flowing between the elongated bore and the external location, and (ii) a metering position in

10 which the land exposes at least a portion of the first aperture while continuing to overlap the portion of the sleeve disposed between the first and second apertures to enable fluid to flow between the elongated bore and the external location.

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